

Failure Rates of Infiltration Trenches/ Basins Assessed in Suburban Maryland

How long do infiltration practices operate effectively after they are installed? The answer, according to a field survey by Galli (1993), is not very long. He inspected over 60 infiltration trenches and basins constructed in the coastal plain and piedmont of Maryland during both dry and wet weather.

The structures ranged in age from six months to six years. They were all located within Prince George's County, which has been a regional leader in infiltration design standards, plan review, and construction inspection.

Galli found that less than half of the nearly 50 infiltration trenches he surveyed were working as designed. Furthermore, the longevity of trenches declined over time — less than one-third still functioned after five years.

Most trenches served smaller commercial developments of two acres or less. The trenches all incorporated some mechanism for runoff pretreatment, either in the form of a sump pit (N=31) or a grass filter strip (N=7) (Figure 1).

In addition, the majority of trenches had observation wells, bottom sand layers, and filter fabric protection on the trench walls and one foot below the trench surface. Soil borings were taken at 85% of the sites to confirm the underlying soil properties. As with many stormwater practices, the trenches were not maintained after their construction. The major performance problems encountered in the field are itemized in Table 1.

The effectiveness of the protective 25-foot grass filter strips was marginal. All of the filter strips experienced erosion, spotty vegetative cover, or short-circuiting within two years after construction. Sump pits, on the other hand, appeared to be a more effective pretreatment technique. The median volume of trapped sediment in the sump was about 10 cubic feet, and was composed of coarse inorganic sediments (55%), fine sand and silt (25%), and coarse organic matter and litter (20%).

Although the volume of trapped sediments in sump pits clearly indicates the critical need for pretreatment, the sediment volume did not increase with age. This finding implies that unless sump pits are regularly cleaned out, it is likely that the trapped sediments will be resuspended and transported inside the trench.

Figure 1: Schematic of Sump Pit Used to Pretreat Runoff Before Infiltration (Galli, 1993)

